

## ABSTRACT

A time division duplex using code division multiple access user equipment receives a plurality of data signals in a time slot. Each data signal experiences a similar channel response. The user equipment receives a combined signal over the shared spectrum in a time slot. The combined signal comprises the plurality of data signals. The combined signal is sampled at a multiple of a chip rate of the combined signal. The similar channel response is estimated. A channel response matrix or a channel correlation matrix is constructed based on in part the estimated channel response. A spread data vector is determined based on in part a fast fourier transform (FFT) decomposition of a circulant version of the channel response or channel correlation matrix. The spread data vector is despread to recover data from the matrix.